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ABSTRACT

The total quality management (TQM) concepts of W. Edwards Deming were used at Mt. Edgecumbe High School in Sitka, Alaska. The school is an alternative school with about 210 students and 13 teachers. The students are a mix of native Alaskans and immigrants from other states. TQM was introduced into the school by a teacher. Students used TQM to examine their own study habits and become more efficient with their study time. Students also set goals and expectations for their class. TQM says that individual workers cannot contribute to an enterprise if they do not understand and give support to its purpose. More teachers and other staff at Mt. Edgecumbe High School began to employ TQM. Students rewrote Deming's 14 points and made them apply more directly to the school. TQM was also used to shape curriculum. Student discipline problems decreased significantly after implementation of TQM. One problem was learning how to assess student and teacher progress without disrupting the TQM process. The success of TQM at Mt. Edgecumbe High School can serve as an example for schools nationwide. (JPT)

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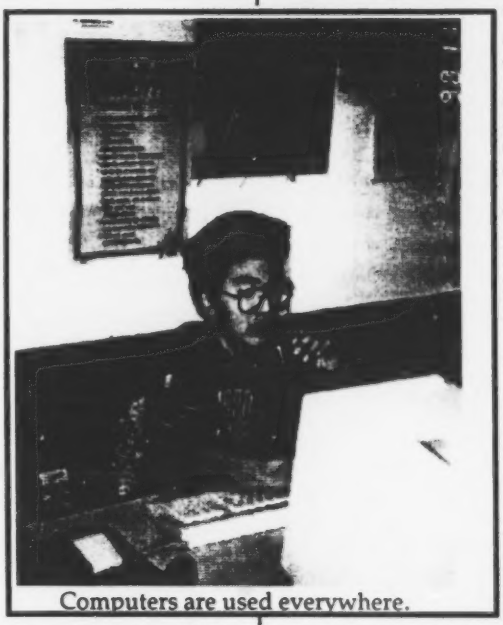
INTRODUCTION

Mt. Edgecumbe High School (MEHS) is situated on a small island across the channel from Sitka, Alaska. Started in the 1947 as a school for Native Americans, in 1984 the school was removed from the control of the Bureau of Indian Affairs and converted into an "alternative" school under the control of the State of Alaska.

The phrase, "Native Americans", denotes a variety of peoples descended from the Tlingit, Haida and Tsimpshean Indian tribes as weli as Eskimos and Aleuts. Archaelogists have traced Aleutian culture back to 6,000 B.C. Some portions of the Eskimo culture have been traced back to 300 B.C. They are the descendents of a hardy race of people who learned how to survive for centuries in a harsh natural environment. Now they have to survive "civilization".

Alaska is a very large state with the smallest population of all the 50 states. This population is spread over a land mass more than twice the size of Texas. With such a low population density, it is difficult to maintain high quality high schools in the small villages and towns. (From the fourth to the eighth grade, I attended a one room schoolhouse in a rural area, and while we did not have many so-called modern facilities, I often think that being in a school where the eighth graders taught the fifth graders and all 17 of us played together at recess, gave me a better start than if I had been in a big city school.) At the high school level, it just isn't possible to equip a large number of small schools with all the facilities they require for a first rate, modern education. MEHS is one of the solutions to this problem attempted by the State.



Computers are used everywhere.

MEHS is a residential school with about 210 students and a teaching faculty of 13 people.

I went to Sitka during the first week of November, 1990, because I had heard that the school was engaged in a unique experiment in education, applying the quality management concepts of W. Edwards Deming to the operations of the school. This is a report of what I found.

THE INCOMING STUDENTS

It is important to understand the origins of the students at MEHS. Many are drawn from the same population which would have come to the school when under the Bureau of Indian Affairs, that is, the students are 90% "rural". Some come from villages and settlements in Alaska with too few students to support a well equipped high school., while others come from modern cities such as Juneau.

The average income in rural Alaska is low, compared to the rest of the USA. At MEHS there is a mix of native Alaskans, having their own tribal customs and language, along with the children of immigrants, from "the lower 48", who came to Alaska, seeking a different way of life. All types are brought together at MEHS.

Larrae Rocheleau, the Superintendent, described the incoming native Alaskan students this way:

"Our Native American students, for the most part, have extremely deep ties to their heritage and are struggling to keep the values and pride of the past while adjusting to a world dominated by another culture, another language and different social values. We attempt to nurture that Native pride and build on those positive feelings without emphasizing the negatives of adjustment"

The Superintendent is clearly an idealist. That fact comes through as soon as you start to interview him. He is also a very practical man. He accepted the job of starting a new school because he wanted to create an institution which would make the most of these young people. He was not interested in creating an elitest school. "Our job is to provide value-added education, not to select a few who don't really need us." One of his major objectives was to turn these students into entrepreneurs who would go back to their villages and make a difference.

Myron Tribus divides his time between Exergy Corporation, a company which is introducing a new approach to electric power generation, and his work as a consultant in quality management. With over 30 years experience as a teacher he has also served as Assistant Secretary for Science and Technology in the US Department of Commerce. He was a senior vice president in the Xerox Corporation and Director of the Center for Advanced Engineering Study at MIT. He is a colleague of Dr. W. E. Deming.

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The State Board of Education and the Superintendent recognized that Alaska is a member of the Pacific Rim Countries and that Alaska's natural trading partners are Japan, China and the countries of Asia. In that spirit they decided that all students would learn either Chinese or Japanese. The Superintendent planned courses in entrepreneurship and sought teachers who would use "project oriented learning" as a way to get the students into the habit of being purposeful in the application of what they learned. The Superintendent recruited faculty who shared this view.

HOW DEMING'S IDEAS ENTERED THE SCHOOL

The new faculty shared the vision of the Superintendent, but among them was one who was extremely enthusiastic. David Langford saw in the plans for the school an opportunity to fulfill his own ambitions as a teacher.

According to the Superintendent and David Langford, the school ran with enthusiasm for the first three years. Then it began to "flatten out". A fortunate turn of events changed the school's approach. During one of David's excursions to the "lower 48", visiting Gilbert High School in Phoenix, he attended a session with an executive in a company involved in the quality movement. David was intrigued with TQM concepts. He followed up by reading as much about quality as he could, by talking with executives who were in companies applying TQM and by quizzing the quality experts he could find. David concluded that Deming's ideas could and should be applied in education. David persuaded the Superintendent, Larrae Rocheleau, to accompany him to another Deming Seminar and both men came away convinced Deming's message would apply to their school.

David began by introducing Deming's ideas into his classes in Business and in a special course he dubbed "Continuous Improvement". In this latter course the students read *Out of the Crisis* while David prepared workbooks for the students to use to develop data on their own study habits. Although the first efforts were far from perfect, the students took to the instruction with great enthusiasm.(See box below, left) By applying simple run charts to their own study habits they began to discover and remove inefficiencies from their own lives. One student reported that whereas he had THOUGHT he was spending two hours in study, by keeping records he found he was spending only about 35 minutes!

David experimented with different approaches to overcoming student indifference to learning. Before he became involved in quality management techniques, he observed a general lack of motivation on the part of the students. He found, however, that if he spent a great deal of time at the start of the semester (some would say an inordinate amount of time,) discussing such questions as "Why are we here?", "What do we want to get out of the course?", "What are the barriers to success?", and in general, examining the question, "What does it mean to do this course with quality?" he caused the students to examine their own objectives and thereby alter their attitudes. The result was that in the remainder of the semester, the student enthusiasm, drive, and efficiency so improved that they learned much more than they otherwise would have learned. What was "lost" at the start of the semester, was more than regained in the remainder. It takes a great deal of courage to break with tradition this way. It could not have been done without the support and encouragement of the superintendent. Those who would attempt something similar should keep this point in mind.

Having taught elsewhere, David was impressed with what a difference the explicit examination of quality made in student performance. Through this dialogue, the students developed their own sense of why they studied. When I asked students about this they concurred, saying, "We really didn't understand before. Then we just did what we were told, but didn't think about it".

Journalism class, with Kathleen McCrossin, where students produced a high quality newspaper.

David's first workbook on the use of statistics was highly creative and original but because he had no formal training in statistics, it contained several errors. However, when these were pointed out he quickly corrected them. There are a few text books which have been aimed at teaching statistics in high schools but none of them have been written to present statistical thinking as a "tool" for a student to use to improve their own approach to learning. David Langford's workbook is, to my knowledge, the first attempt in this direction.

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An unexpected dividend was that the student's enthusiasm for this approach to learning began to affect the other teachers. Indeed, it is fair to say that the students in David's class in "Continuous Improvement" became the shock troops of the school. Gradually, some, but not all, of the teachers began to follow David's example and adopted similar approaches. The students in these classes became "co-managers" of their education. The teachers became enablers, not task masters. Morale improved. Motivation improved. With the Superintendent's enthusiastic support, TQM was launched.

For students and faculty, alike, the computer is a tool, useful for all classes. Here, for example, is Don Surgeon, who teaches global issues and government, working alongside students from other classes.

PURPOSE IN EDUCATION

One of the basic tenets of Deming's teachings is that individual workers cannot know what to do to contribute to the enterprise if they do not understand and give support to its purpose. Furthermore, this purpose must be constant and not changing every day. It must be a purpose which attracts their hearts and minds. The students, the faculty and the administration spent considerable time developing a consensus about the purposes of the school. Given a purpose for the school, the teachers and students translated the school purpose into the purposes of their classes. The students could relate these to their own purposes. This affirmation took time, but it provided a good basis for attacking the task of applying continuous improvement, for now everyone knew the direction they should take.

One weakness, which became apparant later, was that the people who work at the dormitories were not part of this consensus building. During my visit it became clear that this deficiency would have to be rectified. The class-rooms and the dormitories are physically separated by being at opposite ends of the campus. During a session with the dorm personnel, it became evident that they are eager to be involved. Actions are now underway to include not only the dorm personnel, but also food service, office staff and maintenance personnel.

The faculty and students have continued to work on the educational objectives of the school. See, for example, the statement of purpose adopted through consensus reproduced at the end of this report.

The purpose of the school was not crafted on high and handed down to the students. Because it is the product of consensus building at all levels the statement of purpose of the school permeates all aspects of campus life. I believe this is unique among educational institutions at all levels.

SPREADING THE COMPETENCE

As more of the teachers began to show an interest, David and the Superintendent developed workshops in which the teachers could develop their skills and understanding of continuous improvement.

In this effort they were handicapped by not having been trained in TQM themselves. They attempted to adapt whatever they could read in various sources. They acquired videotapes from the Juran Institute, from MIT, from Bill Conway, from anywhere they could (on a limited budget). They also read widely in the literature of the social science. The Superintendent, for example, was greatly influenced by the writings of Covey (See box, below, left) The faculty are aware of this lack of training and are eager to learn.

On the other hand, I concluded that their isolation from the main stream thinking was an advantage. They had to learn to recognize and solve their own problems. Had they been exposed to the "advantages" of training, it seems likely to me they would not have been so bold and would not have taken the novel paths they did. They are now positioned to be very critical learners and in some areas, leaders.

The students exhibit a surprising maturity with respect to TQM. What they know, they know well. At the end of this report I have reproduced a student analysis of the problems they see other people (and themselves) having in changing paradigms. What they found, on their own, in MEHS, describes many of my own experiences, on four continents, over ten years.

Covey, Stephen R. The 7 Habits of Highly Effective People, Simon and Schuster, 1989

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WHAT I SAW DURING MY VISIT

During my four day visit I met and talked with students, faculty, administration, dorm managers, the nurse, the counsellors and a few people from Sitka and the Sitka School System (across the channel, on the 'big island'). To my knowledge, this is the only school in the world which is attempting to apply Deming's ideas to the totality of education. I know of many schools which are doing some parts of TQM, but no other school, at any level, to my knowledge is trying to do it *all* in an integrated fashion.

I looked at student homework (mostly done on a computer), talked with the students, quizzed them about their understanding of what they were doing, and what they had learned. I talked with the faculty, trying to judge their commitment and understanding of TQM. I talked with the administration.

My reaction? Amazement and admiration. A young girl, of Tlingit/Haida descent, in her junior year, asking me about how to get into Harvard. Another girl, probably about 17 years of age, talking seriously with me about how people in industry are working to remove the effect of fear which an executive of high level might engender in a worker with whom he talked. Or wanting to know if so many levels were required. In a biology class, taught by Gary Jarvill, I reviewed the hypercards the students had prepared as a form of "computerized-mini-encyclopedia" suitable for instruction. Only a few minutes of examination of the student prepared hypercards and I understood that no one could prepare this information in such a form without having learned it very well. One student's deck of hypercards had 76 cards in it, each one linked to the others in a logical fashion. By clicking on one card the user could inquire into the influence of soil chemistry on the plant. By clicking on another icon the user could learn about the economic importance of the plant in Alaska or how the plant reproduces itself and spreads.

From these hypercards anyone can see that the students have learned some *facts* about biology. But more importantly, from the way the facts are organized, it is also clear that they have learned how to relate these facts to one another in a logical fashion. In this stage of learning, they could use the hypercard structure as a tool. But beyond that, they had learned how to organize their knowledge of facts. In my own experiences as a teacher, I always found this the hardest to teach at the college level. Here I saw it happening with high school juniors.

In the class on entrepreneurship, taught by Marty Johnson, I watched the students prepare and package smoked salmon for sale in Japan. The students had used a taste panel of local Japanese to determine the flavor and texture Japanese people liked the most. Then they developed a standard procedure to produce the same taste and texture every time. To achieve the desired taste required using a certain kind of salmon, exposing it for a certain time and temperature, using a special brining solution, which they had determined experimentally yielded the proper taste, and a certain amount of time in the smoke from the right mixture of wood shavings, using slices of the fish cut to a certain thickness and size. By studying the packages of smoked fish sold in Japan they developed an attractive package which would fit in small Japanese refrigerators. They developed their own distinctive label, in Japanese, of course, and they test marketed the product in Japan. In 1989 the students received an order for $140,000 worth of the smoked salmon that they could not fulfill. At the time of my visit they had received another order, this time from a Korean Company, which would amount to over $600,000 per year! Their current problem was that the company, which had asked to take on the task of fulfilling the order, did not want to follow their quality standards. I do not know what they will decide to do.

Bill Denkinger, Principal, with entrepreneurship students from Marty Johnson's class, with their smoked salmon for export to Japan.

The high school class is becoming the source of local expertise just as the Superintendent had hoped it would become, though I doubt he expected it to happen so soon and on such a scale.

In this class I had good discussions with the teachers and students over how to use SPC to gain information on the variability and perhaps to reduce it.

The students and faculty have not yet studied design of experiment. The course on entrepreneurship is obviously a wonderful situation in which to learn about it. Ron Moen has been teaching design of experiment to junior high school students. When I telephoned him for help, he was greatly interested in sharing his work. Ron and David hope to meet this summer and to build on Ron's experiences.

One course which I saw only by videotape, but which impressed me greatly, is the "Ropes Course", which is similar to the "Outward Bound" courses which have been so much publicized. At the start of the school year all the incoming students and all of the faculty participate in this course. The students (protected by suitable safety harnesses) undertake a number of challenging activities such as climbing to a high place and falling backwards to be caught by their classmates, or leaping to grasp a trapeze

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bar about 30 feet high, or jumping from a shaky platform, high on top of a pole, with safety provided by classmates on the end of a rope. In another exercise, they take turns leading one another blindfolded through parts of the Alaskan wilderness.

Superintendent Larrae Rocheleau explained the objective of the course this way: "When the students arrive they are dependent. Their paradigm says, "I can't do it because you don't do what you are supposed to do". They look to "you" for guidance and support. By being challenged they begin to become independent. In this mode they say, "Yes, I can do it". They become not only self confident, but also self centered. They say "I" a great deal. Finally, some recognize interdependence and they say, "We can do it together". The objective of the course is not only to give self confidence, but to move the students from "You", to "I" to "We". Larrae believes that this course is an essential prerequisite to the success of all the other courses. Many of the students need to establish their self confidence, otherwise they will not try the things they are asked to do. They will be unable to form teams. As I see it, MEHS is trying to develop *autonomous team players.*

I did not appreciate how important the rope course is as a deliberate attempt to build character, until I met some of the first year students who came from a small community. I was reminded of youngsters I had met in the hills of Kentucky who came from similar (if warmer) rural backgrounds. When bussed to the county schools, they often do not take to the classroom situations where they are made to feel inferior. Thrust into an entirely new life in which they had to learn new habits of thought and in a very short time become independent learners, I saw many of them turn away, not because they were not bright enough, but because the system judged them on artificial grounds. An educational system which ignores the psychological aspects of the students' prior preparation (or lack of it) forever assigns them to the lowest rungs on the social ladder. In my view it is no educational system at all. Such an approach does not look upon the youngsters as humans to be developed. Rather it looks upon the young generations as a crop to be winnowed. The "Ropes Course", to the casual outsider, might look like a lot of fun (it is) but not as a serious element of education. The ropes course does for all the students what competitive athletic contests are supposed to do for a few. In my opinion, it does it better.

DEMING'S IMPACT ON THE CURRICULUM

David's class has rewritten Deming's 14 points so that their application to education is more apparant. They have also identified the various "customer-supplier relationships". (See box at end of this report) After flowcharting some of the activities of the school and studying the objectives of the various teachers, the students and teachers, together, set about restructuring the system. (The words "peristroika" and "glasnost" often appear on the walls of the school, even in the Superintendent's office!) The class schedule was changed to combine functions. For example, when the students write a report for the entrepreneurship class, that report is accepted as part of the homework in English. (*Eliminate barriers between departments*) The students are expected to turn in a perfect report. The phrase, "No Excuses" appears everywhere. The students say, "We are after quality , not quantity. What is the point of writing a number of mediocre essays? Instead, let us write a few reports, but let them be excellent." The English teachers, Kathleen McCrossin and Ruth Fairchild, insist on perfect spelling, on good style, on correct grammer...in short on excellence. Actually, after an inquiry into what characterizes a perfect essay, the students do not have to rely on the teacher's judgment. They supply their own.(*Eliminate mass inspection*)

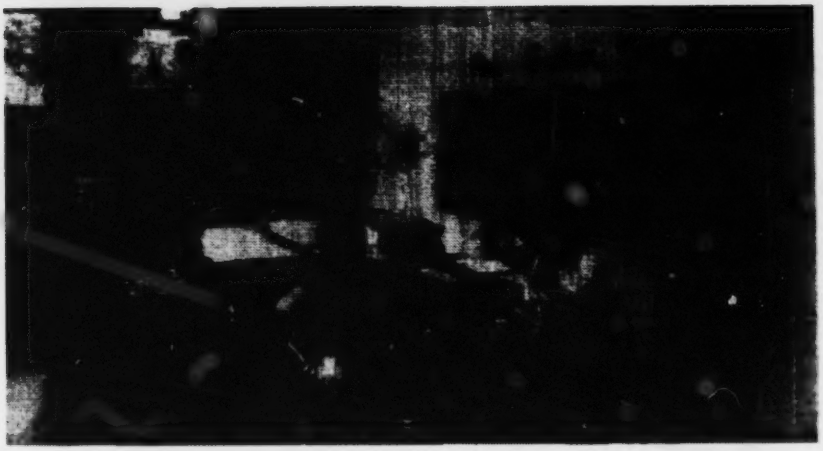
I inspected a few hypercards prepared by students on the theme "How to Write A Perfect Five Paragraph Essay". In this essay they discussed how to choose an appropriate title, how to write an introductory paragraph, how to structure a logical argument, how to develop conclusions and how to avoid cliches. Having, themselves, written such a learning instrument, they were equipped to apply the criteria themselves.

Deming's influence at MEHS is very strong. Here Bill Denkinger, Principal, David Langford, Instructor, Dr. Deming and Larrae Rocheleau, Superintendent, meet in Minneapolis in May, 1990.

There are no grades, no "incompletes", no "F's". The task is not complete until the work is perfect. The students have defined perfection for themselves and, therefore know how to aim for it. (*Create joy in work*)

Incidentally, the first computer course begins by using the computer to teach speed typing. All students understand that they will do their homework on a computer, using word processors, spread sheets, graphics programs, etc. They appreciate the importance of being able to type well, because they know they will be doing so much of it. The typing exercise is the only one in which I saw the computer being used in the "drill and grill" mode. All other

One evening I spoke for a class David Langford and LarraeRocheleau teach at The University of Alaska for people in Sitka. The local postmaster, a student in the class, complained bitterly that he is required, by postal rules and regulations, to rate all his people. Although his postoffice has three times received a rating of outstanding, due to his adoption of TQM, he still has to follow regulations. We had a spirited discussion in the class about what to do when the system forces a manager to use bad management.



Students in the entrepreneurship class engage in problem solving sessions.

activities seemed to be creative; using the computer as a tool to accomplish something, as opposed to learning computers as an end in themselves.

In the business class I watched students preparing spread sheets to reflect what it will cost them to live in their chosen life style after they graduate. They take into account mortgage payments, taxes, cost of living changes, projections for cost of transportation, schooling, etc. In this way they learn the importance of inflation, interest rates and taxation. They analyze what it will require to live as they wish and in the process learn about graphical presentation of data, about simple finance, about business. I saw a great deal of mutual learning as students compared their results and taught one another some of the tricks of financial analysis. Because the students are working creatively on something which interests them, the teacher does not have to be in the room when classes start or during the class time. My host sat with me to discuss the course and from time to time a student would come with a question. Most of the times the questions were not answered but instead the teacher would pose a question or make a suggestion for something to try.

My visit coincided with the November elections. In the Alaska Issues and Government class, taught by Brenda Campen, I saw the result of some "desk top publishing". The students had prepared a small guide to voting, including a very well written essay on the importance of voting, an analysis of some of the propositions on the ballot and some of the candidates positions. When I first read it, I thought it had been sent from outside the school, it was that professionally written.

DISCIPLINE

Student behavior problems have all but vanished. I examined the data from the front office on the rate of "conduct report" issuances. In the last period examined, the number of students involved in disciplinary action varied between 1.5% and 0.5% of the student population.

All categories of discipline problems are analyzed separately (using the spread sheet, Excel) and examined graphically. There were a few minor errors in determining how to set the control limits. When I reorganized the plotting, it could be seen that the process goes out of control every weekend. The faculty is thinking of what to do about this "special cause". One faculty member, however, was concerned over the very low rate of discipline reports. Her concern was that there may be too much discipline and that this may result in psychomatic illnesses. I proposed that an analysis be made of visits to the nurse to see if they correlated with exams, etc.

I came away enthusiastic over what I saw. The attempt is genuine. The school is obviously at the beginning of a journey. The faculty is far back on the learning curve but well aware of what they have yet to learn. They do not practice the self delusion I encounter so often in my industrial visits. They know they do not know and are committed to doing something about it. The most prominant attitude is one of frustration at seeing a vision of what could be and having so far to go. But in my eyes, they have come a long way and have no need to apologize to anyone. I compare their achievements with what I know goes on elsewhere in the USA. I am aware of the poor preparation that many of the students have before they start at MEHS. Through the use of TQM the staff is able to devote more attention to each individual student. The students also help one another to become independent learners. This school is demonstrating the true power of education.

The extraordinary results MEHS produces with their students recalls the remark of Hutchins, when President of the University of Chicago, "No one knows what can be done with education because we have never really tried."

While visiting MEHS I telephoned a few colleagues for assistance to the school. Former colleagues at MIT made a gift of the self study tapes on statistics by Lloyd Nelson. Ford Motor Company offerred to have David Langford visit them to see first hand how statistical methods are applied in industry. The headquarters of the NSPE responded immediately by sending educational materials. Ron Moen was enthusiastic to help. So were David and Carole Schwinn. Frank Voehl of Qualtec offered to pay for a visit to Florida Power and Light.

CHALLENGES

When a school undertakes such a radical change in education, it is bound to encounter new problems. The most difficult one to resolve is concerned with the evaluation of students and staff. The faculty, the students, and the administration, all agree that evaluation is destructive to the

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learning process. Yet when the students apply for entrance to a college, they are expected to show the usual grades and test scores.

The faculty is confident the students will succeed wherever they go. 47% of the students who graduated from MEHS have entered college and are still there or have graduated. This is significantly better than the nationwide average.

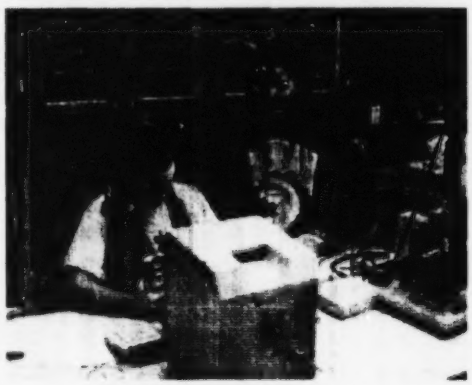
Students who have left MEHS and are now in college report back that they are disappointed to find that the environments into which they have gone are not "learning environments". I was asked by several students to advise them where they could go to continue their studies of quality and be in a quality environment. I had to say I did not know of a single school, anywhere, that might meet their needs. Perhaps one of the smaller liberal arts schools, such as Antioch College, might be appropriate. I did not know (but I did put in a good word for Dartmouth College!).

The principal, Bill Denkinger, frets over the fact that he is expected to rank the faculty in his reports to the state. He sees such ranking as destructive to morale, but he is stuck in a system which is designed for a different paradigm.

On the other hand, the faculty is anxious to know how they are doing and wants to get feedback. They are sincere in their desire to understand if they are doing the right things.

Another serious problem arises because the faculty is essentially self taught in quality management. I was their first visitor who has seriously studied TQM. The teachers, students and staff were hungry for lessons in TQM methods techniques. They were especially weak in statistics, none of the faculty ever having had a course in its application to quality improvement. Traditional educational statistics courses are useless for a TQM situation. I did what I could, in a short time, to make some suggestions. Better than that, however, I used the occasion to do a little telephoning to people in the quality movement whom I knew would be interested.(See box, lower left, previous page) Everyone on whom I have called has indicated a willingness to help and the people at MEHS are eager to learn. I believe, therefore, that this matter of getting consultation and instruction in various aspects of TQM for the faculty will be relatively easy to solve.

I only wish I could find the same thirst for learning in the rest of the country.



Two students in biology class use a microscope to create a scanned image which they will use in their homework report.

IMPLICATIONS FOR EDUCATION IN THE USA

I went to Sitka because I had heard that the were using TQM in education. What I saw exceeded my expectations. It is also clear that what has been done at MEHS cannot be "cloned" and simply reproduced elsewhere. Mt. Edgecumbe High School is a residential school. The enrollment is very small, compared to the national average. The ratio of students to teachers is smaller than the national average. What we have at MEHS is a small laboratory in which it has been demonstrated that Quality Management Principles work in education.

The staff at MEHS is eager to share what they have learned. However, they are beginning to be swamped with phone calls, letters and their fax machine runneth over. During my visit a few of the faculty discussed with me the potential to hold a conference during the Summer of 1992, to which educators from around the USA would be invited. They have considered running a mini-summer school on their campus, complete with high school students, faculty and administrators from a dozen schools, as a way to provide "seeds" which might flourish elsewhere. They have also considered a research conference at which there would be papers on various aspects of the experiment thus far. Planning continues.

Probably what they need most of all now, is the addition of a few more staff so they can devote more time to teaching others, to planning for the conference and simply to host the number of visitors who can be expected to show up on their doorstep in the coming year.

It is well known that the educational system in the USA has been failing its citizens. Political leaders, from the President down, have issued solemn pronouncements and "goals". Those who understand TQM have been unhappy and critical of these statements because they consist of goals, without plans to achieve them. These officials apply the managerial techniques which have already ruined much of American enterprise. We expect them to have similar unsatisfactory results when applied in education.

I only wish every one of our political leaders would read the student's interpretation of Deming's 14 points applied to education (see end of report), especially point #12.

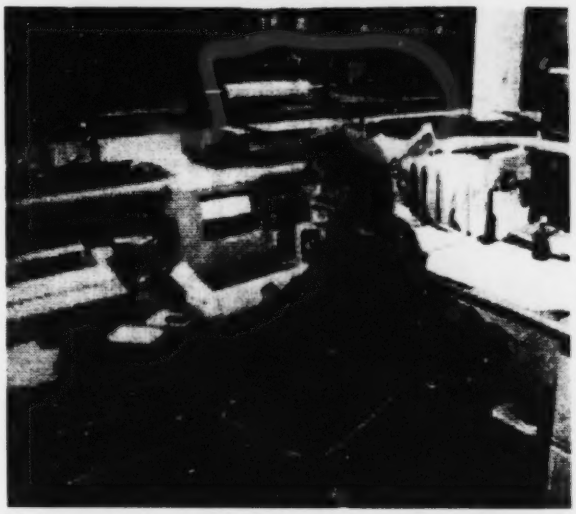
Having made such critical remarks, I have also to admit that even those of us who know about TQM in industry have not, heretofore, provided anyone with a clear directions on how to apply TQM in education. Frankly, we

haven't known how to begin.

The experiences at MEHS, however, now change all that. MEHS provides everyone with an example of how to start. MEHS is an important laboratory for the national cause of education and as such deserves the support and encouragement of all who care about the education of the young. TQM should not be viewed as another educational fad that will come and go. Mt. Edgecumbe High School has adopted TQM as a part of its culture.

The MEHS example should provide the courage to try TQM in education on a larger scale and to learn HOW TO MAKE IT WORK. Having observed one another falter along the road to quality, the students have analyzed the stages through which everyone seems to pass. (see box at end of reprort). As the students and staff at MEHS say, NO EXCUSES.

Robert Gordon Sproul, President of the University of California, used to say, "Youth must be served in its day, or not at all." Let us begin.



The librarian is proud of the way computers are used in the new library. Because the students, like the one shown here, are involved in so many of their own creative projects, library use is up.

Students are expected to apply their knowledge in practical problems. Here the students visiting a local fish plant, looking for ways to apply quality methods.

They apply these methods to school operations, such as the cafeteria, design of dorm rules and regulations, and maintenance.

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Reading the following analysis of the problems of transforming a culture, makes it clear these youngsters are ready to become consultants in TQM. Their observations parallel those of every consultant with whom I have ever discussed the problem.

The Transformation Process

The Continuous Improvement Process Media class at Mt. Edgecumbe High School is responsible for presenting the process to other students, teachers, administrators, parents, business people and other community members. Through their experience they have identified the following transformation process that people typically progress through when moving from the old management system to the new paradigm for quality improvement. It should be noted that some individuals begin at different levels.

1. **Oh no, another thing to do.**
2. **This is interesting, but a waste of my time (or some other reaction).**
3. **Works for you, but it could not work for us; usually followed by listing reasons why it cannot be done at their site.**
4. **Denial that it could actually be working.**
5. **Questioning - about initial reaction in #1.**
6. **Angry/mad/frustrated/defensive**
7. **Seek more information and look for transference of theories and applications or completely reject.**
8. **Like the idea, but no action; advanced lip service.**
9. **Attempt involvement.**
10. **Enthusiasm and relief**
11. **Progress not as fast as they like.**
12 **Understanding and then profound knowledge.**

The computer class-room is in almost constant use, from early morning to late at night. Here students in the Computer II class are working while students from other classes use the otherwise vacant computers to do their homework .

There is a great deal of sharing of technical information about computers. Some students, of course, are interested in computers themselves; most consider it a tool for other purposes.

The following statement was prepared by the students and staff of the school.

MT. EDGECUMBE HIGH SCHOOL

Sitka, Alaska

MISSION STATEMENT

Mt. Edgecumbe High School is a paradigm shift in philosophy to the usual high school program. Each curricular area offers innovative teaching methods that not only enhance opportunities for Mt. Edgecumbe High School students, but serve as models for other high schools.

Mt. Edgecumbe High School provides new and important education opportunities for Alaskan students. The school places high expectations upon students, administrators, and staff. Program and curriculum are based upon a conviction that students have a great and often unrealized potential. The school prepares students to make the transition to adulthood helping them to determine what they want to do and develop the skills and the self confidence to accomplish their goals.

Mt. Edgecumbe High School students are required to pursue rigorous academic programs that encourage students to work at their highest levels. Administrators, teachers, and other staff are required to keep current on educational advances and to initiate innovative, challenging, and stimulating classroom programs and activities.

Teachers and staff analyze issues to anticipate future social and economic needs of Alaska, such as Alaska's economic position among the Pacific Rim nations, and to integrate an educational approach to these issues into the curriculum. A strong curriculum in English, social studies, mathematics, science/marine science, computers/business, career exploration, Asian languages, and physical education is provided.

Special emphasis is placed on the study of both historical and contemporary topics specific to Alaska. Study of the history, culture, and languages of the Pacific Rim are a major curricular area and to the extent possible Pacific Rim studies are applied across the curriculum.

Vocational education is stressed through entrepreneurship and work study. Cottage industries are run by students. Traditional vocational education is offered on a limited basis.

Opportunities for leadership, public service and entrepreneurship are integrated into the program, both during and after regular school hours. The school prepares students for the academic demands of being away from home and managing time effectively, Some students are selected for admission who are having a difficult time with their local environment. Staff work within available resources to help these students become productive citizens.

Mt. Edgecumbe High School as a boarding school offers students a wide range of support activities in both academic and residential programs, to assure the success of all students. To facilitate personal growth and decision making skills, each student is assisted, guided, and challenged to make choices about future academic or technical schooling and alternative methods of making a living. Students are respected for their cultural background and diversity. Students and teachers are encouraged and expected to offer in-

These students in the CIP-Media class are the "shock troops" for culture change. I wonder if an admissions officer in a university will understand the significance of this subject. Will it be allowed "college credit"? I wish every MBA candidate would go through this course.

This is a course which could be copied in any high school in the USA.

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The following modification of Deming's 14 points was prepared by David Langford's class, "Continuous Improvement"

Modified Deming Points for Continuous Improvement of Education

1.Create constancy of purpose toward improvement of students and service. Aim to create the best quality students capable of improving all forms of processes and entering meaningful positions in society.

2.Adopt the new philosophy. Educational management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3.Work to abolish grading and the harmful effects of rating people.

4.Cease dependence on testing to achieve quality. Eliminate the need for inspections on a mass basis (standardized achievement test, minimum graduation exams etc.) by providing learning experiences which create quality performance.

5.Work with the educational institutions from which students come. Minimize total cost of education by improving the relationship with student sources and helping to improve the quality of students coming into your system. A single source of students coming into a system such as jr. high students moving into a high school is an opportunity to build long term relationships of loyalty and trust for the benefit of students.

6. Improve constantly and forever the system of student improvement and service, to improve quality and productivity.

7.Institute education and training on the job for students, teachers, classified staff and administrators.

8.Institute leadership. The aim of supervision should be to help people use machines, gadgets and materials to do a better job.

9.Drive out fear, so that everyone may work effectively for the school system. Create an environment which encourages people to speak freely.

10.Break down barriers between departments. People in teaching, special education, accounting, food service, administration, curriculum development and research etc. must work as a team. Develop strategies for increasing the cooperation among groups and individual people.

11.Eliminate slogans, exhortations, and targets for teachers and students asking for perfect performance and new levels of productivity. Exhortations create adversarial relationships. The bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the control of teachers and students.

12.Eliminate work standards (quotas) on teachers and students, (e.g. raise test scores by 10%, and lower dropouts by 15%.) Substitute leadership.

13.Remove barriers that rob the students, teachers and management (principals, superintendents and central office support staff) of their right to pride and joy of workmanship. This means, inter alia, abolition of the annual or merit rating and of management by objective. The responsibility of all educational managers must be changed from quantity to quality.

14.Institute a vigorous program of education and self-improvement for everyone.

15.Put everybody in the school to work to accomplish the transformation. The transformation is everybody's job.

Here is an analysis of the "customer" and "supplier" relationships in a high school system, prepared by the students in their "Continuous Improvement" class.

CUSTOMER	SUPPLIER	SERVICES
Students	Teachers	System Management Curriculum Design Counseling Leadership Materials and Equipment
	Administrators	Systems development and analysis Materials and Equipment
	School Boards	Policy
Teachers	Administrators	Materials and Equipment

This is how the students analyze different teaching styles and the resulting effect on student learning processes.